PrescripTech : Enhancing Healthcare Access through Generic Prescription Conversion

Shubham Jadhav, Rakesh Shetty, Manoj Gujare, Prof. D. D. Sarpate

Artificial Intelligence & Data Science Engineering, Zeal College of Engineering & Research, Pune, Maharashtra, India

ARTICLEINFO

ABSTRACT

PrescripTech introduces a pioneering approach to healthcare access and affordability by converting brand-name conventions into original general druthers. Using sophisticated algorithms and integration with electronic health records (EHR), PrescripTech seamlessly analyzes patient data to recommend cost-effective drug options. This innovative platform addresses the pressing issue of drug affordability by promoting the use of generics, which offer similar efficacy at significantly lower costs. By easing cost-conscious prescribing practices, PrescripTech not only reduces fiscal burdens on cases but also contributes to the sustainability of healthcare systems worldwide. Also, PrescripTech has the implicit to profoundly impact healthcare access, particularly for underserved populations. By lowering drug costs, it ensures that essential treatments are accessible to individualities anyhow of their socioeconomic status. This democratization of healthcare aligns with broader pretensions of health equity and social justice, fostering positive issues for communities encyclopaedically. As a lamp of healthcare invention, PrescripTech exemplifies the transformative power of technology in optimizing healthcare delivery and advancing the principles of affordability and availability.

Keywords: PrescripTech, Generic Prescription Conversion, Medication Affordability, Healthcare Access, Advanced Algorithms, Electronic Health Records, Healthcare Innovation.

I. INTRODUCTION

In today's healthcare landscape, access to affordable drugs is a critical concern worldwide. High drug costs frequently pose a significant hurdle to healthcare access, particularly for economically disadvantaged populations. One approach to addressing this challenge is the creation of generic alternatives, which offer similar efficacy at a fraction of the cost of brand-name medicines. Still, despite the potential cost-saving

benefits of generics, their uptake remains low due to various factors, including prescribing practices.

PrescripTech is a pioneering initiative aimed at revolutionizing healthcare access by converting prescription conventions from brand-name medications to original generic alternatives. This innovative solution harnesses technology to automatically analyse prescriptions and recommend suitable generic equivalents, thereby empowering patients with access to more affordable treatment options. The primary objective of PrescripTech is to bridge the gap between traditional practices and cost-effective healthcare outcomes. By seamlessly integrating into existing electronic health record (EHR) systems or operating as standalone software, PrescripTech ensures that healthcare providers can smoothly transition to prescribing generics without disrupting their workflow. Additionally, the platform offers real-time updates on generic drug availability, ensuring that patients receive timely and accurate prescriptions.

Through the implementation of PrescripTech, healthcare stakeholders can achieve significant cost savings while simultaneously improving patient outcomes. By reducing drug costs, PrescripTech not only enhances healthcare affordability but also promotes medication adherence, thereby reducing the risk of disease complications and hospitalizations.

In this research paper, we present the development and deployment of PrescripTech, along with an evaluation of its impact on healthcare access, medication adherence, and cost savings. Additionally, we discuss the potential implications of widespread adoption of generic prescription conversion technologies for healthcare policy and practice. Overall, PrescripTech represents a promising step towards a more equitable and sustainable healthcare system, where access to essential medications is no longer determined by financial constraints. In the ever-evolving landscape of healthcare, innovations continue to play a pivotal role in addressing the challenges associated with accessibility and affordability.

One such ground-breaking concept gaining momentum is the PrescripTech initiative. At its core, PrescripTech aims to enhance healthcare access through the strategic conversion of prescriptions to generic alternatives. The rising costs of medications pose a significant barrier to healthcare access for many individuals. Recognizing this, PrescripTech seeks to leverage the potential of generic prescriptions, a cost-effective alternative to brand-name drugs, in order to make essential medications more affordable and within reach for a broader demographic. This initiative explores innovative technologies and strategies to streamline the conversion process, ensuring that patients receive equally effective yet more economical generic alternatives. By collaborating with healthcare providers, pharmaceutical companies, and technological experts, PrescripTech envisions a future where generic prescription conversion becomes a standard practice, promoting financial sustainability in the healthcare ecosystem.

II. METHODOLOGY

PrescripTech's methodology is anchored in a comprehensive and innovative approach to revolutionize healthcare access by promoting the conversion of prescriptions to generic alternatives. The methodology encompasses strategic principles and advanced technologies aimed at addressing economic barriers, improving adherence, and streamlining prescription practices.

1. Strategic Generic Prescription Conversion:

Identification of Cost-Effective Alternatives: The methodology begins with an in-depth analysis of pharmaceutical markets to identify generic alternatives that offer comparable efficacy to brand-name medications but at significantly reduced costs. This involves collaboration with pharmaceutical

International Journal of Scientific Research in Science, Engineering and Technology | www.ijsrset.com | Vol 11 | Issue 2

453

companies and continuous monitoring of market trends to ensure the inclusion of the most cost-effective options.

Patient-Centric Approach: PrescripTech adopts a patient-centric philosophy, prioritizing the financial well-being of individuals. The methodology involves educating healthcare providers and patients about the benefits of generic medications, fostering a collective understanding of the economic advantages without compromising on treatment quality.

2. Advanced Technological Integration:

Optical Character Recognition (OCR) with Pytesseract: PrescripTech employs OCR technology, leveraging Pytesseract, to extract text and information from prescription images. This facilitates the digitization of prescription data, making it accessible for further analysis and aiding in the identification of generic alternatives.

Object Detection Using YOLO: The integration of YOLO enhances the system's ability to recognize and classify objects within prescription images. This technology enables efficient identification of medications, dosage information, and prescription details, streamlining the process of recommending generic alternatives.

Machine Learning with Keras & TensorFlow: The methodology incorporates machine learning frameworks, such as Keras and TensorFlow, to develop predictive models. These models analyse historical patient data to predict adherence patterns and recommend personalized treatment plans. This data-driven approach ensures that generic prescription conversions are tailored to individual patient needs and preferences.

3. Healthcare Provider Empowerment:

User-Friendly Platforms: PrescripTech understands the significance of seamless integration into existing healthcare workflows. The methodology focuses on developing user-friendly platforms for healthcare providers, facilitating informed decision-making regarding generic prescription conversions without disrupting established practices.

Continuous Training and Support: To ensure successful implementation, PrescripTech provides ongoing training and support to healthcare professionals. This includes updates on new generic alternatives, best practices for integrating recommendations, and troubleshooting assistance, fostering a collaborative and empowered healthcare community.

4. Monitoring and Continuous Improvement:

Data Analytics for Continuous Monitoring: PrescripTech employs data analytics to monitor the impact of generic prescription conversions on patient outcomes, adherence rates, and overall healthcare costs. This iterative process allows for continuous refinement of the methodology based on real-world data and feedback from healthcare providers.

III. PROPOSED SYSTEM

Users initiate the process by uploading their prescriptions, which are then analysed by PrescripTech's model. This model employs computer vision algorithms to identify and outline bounding boxes around drug names on the prescriptions, followed by the use of optical character recognition (OCR) to transcribe the text within each bounding box accurately. The transcribed text is then compared against a comprehensive dataset of generic drug names stored within the PrescripTech system. If a match is found, the corresponding generic option is

International Journal of Scientific Research in Science, Engineering and Technology | www.ijsrset.com | Vol 11 | Issue 2

454

recommended to the user; otherwise, the original brand-name drug is suggested.

These recommendations, accompanied by dosage instructions and potential cost savings, are presented through an intuitive user interface, ensuring ease of understanding and accessibility for drug users. Users are also provided with the option to provide feedback on the recommendations received, contributing to continuous improvement and refinement of the system's accuracy.

Strict privacy and security measures are enforced throughout the process to ensure the protection of sensitive medical information, fostering trust and confidence among drug users. This streamlined approach to prescription conversion not only promotes drug affordability but also enhances healthcare access, ultimately contributing to a more equitable and sustainable healthcare system.

One key feature of the proposed system is its commitment to advanced drug adherence. Recognizing that affordability significantly influences patient compliance, PrescripTech strives to enhance adherence rates by promoting generic alternatives. This strategic approach not only improves health outcomes but also mitigates the risk of disease progression, ultimately reducing long-term healthcare costs
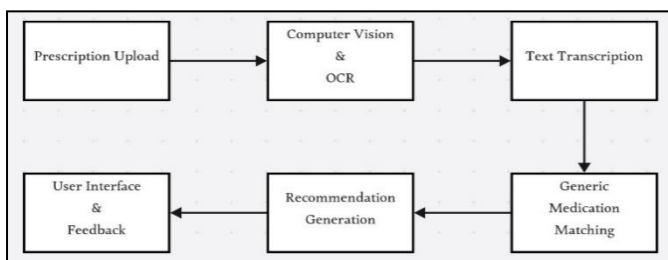

Fig. 1 Block diagram of proposed system

IV. IMPLEMENTATION

Data Collection:

- Scraped data from **https://www.medicineindia.org/** to collect information about generic medicines.

- Dataset includes columns such as Brand name, generic name, package, strength, and price.
- Exported the collected data into a CSV format for further processing.

Brand	Generic Name	Company	Package	Strength	Price
ABAVIR	Abacavir	Genix Pharma	TAB	300 mg	₹ 6500.00
ZIAGEN	Abacavir	Glaxo Smithkline	Tablet	300 mg	₹ 0.00
ABAMUNE	Abacavir	Cipla Limited	Tablet	300 mg	₹ 1444.50
VIROL	Abacavir	Ranbaxy Laboratories Limited	Tablet	300 mg	₹ 2350.00
EPZICOM	Abacavir + Lamivudine	Glaxo Smithkline	Tablet		₹ 0.00
TRIZIVIR	Abacavir + Zidovudine + Lamivudine	Glaxo Smithkline	Tablet		₹ 0.00
REOPRO	Abciximab	Eli Lilly and Company (India) Pvt. Ltd.	Vial	2 mg	₹ 19740.00
ACAMPROL	Acamprosate	Sun Pharmaceuticals Industries Ltd.	Tablet	333 mg	₹ 42.00
GLUCOBAY	Acarbose	Bayer (India) Limited	Tablet	100 mg	₹ 0.00
K-CARB	Acarbose	Blue Cross Laboratories Ltd.	Tablet	25 mg	₹ 30.00
DIACARB	Acarbose	Bal Pharma	Tablet	25 mg	₹ 37.00
ASUCROSE	Acarbose	Wockhardt Ltd.	Tablet	25 mg	₹ 38.00
GLUCARB	Acarbose	West Coast Pharma Works	Tablet	25 mg	₹ 38.00
GLUCAR	Acarbose	Healtheon (A Div. of Glenmark)	Tablet	25 mg	₹ 38.00
DIABOSE	Acarbose	Cardicare (A div. of Microlabs)	Tablet	25 mg	₹ 38.00
DISCARB	Acarbose	Bal Pharma	Tablet	25 mg	₹ 38.00
REBOSE	Acarbose	Arian (SUN)	Tablet	25 mg	₹ 39.00
ZEBAY	Acarbose	Zee Laboratories	Tablet	25 mg	₹ 39.00
DISORB	Acarbose	ELLIFE (ELDER)	Tablet	25 mg	₹ 39.50
RECARB	Acarbose	Bal Pharma	Tablet	25 mg	₹ 40.00
GLUCOBAY	Acarbose	Bayer (India) Limited	Tablet	25 mg	₹ 42.00
ACARB	Acarbose	ORCHID (Mano Pharmaceuticals Pvt. Ltd)	Tablet	25 mg	₹ 45.00
AC TAB	Acarbose	USV-Condor	Tablet	50 mg	₹ 0.00
ACARB	Acarbose	ORCHID (Mano Pharmaceuticals Pvt. Ltd)	Tablet	50 mg	₹ 45.60

Fig. 2 Generic Medicines Dataset

Training YOLO Algorithm:

- Utilized a custom dataset of prescription images annotated with bounding boxes around medicines.
- Trained the YOLO (You Only Look Once) algorithm using the custom dataset.
- Achieved detection of medicines within prescription images using the trained YOLO model.

Fig. 3 Detection of medicines in prescription

Medicine Name Extraction:

- Applied Pytesseract model for Optical Character Recognition (OCR) to extract text from detected regions.
- Extracted medicine names from the OCR output.

International Journal of Scientific Research in Science, Engineering and Technology | www.ijsrset.com | Vol 11 | Issue 2

455

Generic Medicine Matching:

- Matched extracted medicine names with the dataset of generic medicines based on brand and generic names.
- Identified alternative generic medicines if available in the dataset.
- Determined whether alternative generics are available for each detected medicine.

Fig. 4 Alternative Generic Medicines for brand medicines.

Deployment on Streamlit:

Developed a web interface using Streamlit for users to upload their prescriptions.

- Integrated the prescription processing pipeline into the Streamlit application.
- Enabled users to download alternative generic prescriptions in PDF format from the web interface.

Fig. 5 Generic Medicines Prescription in PDF format

V. FUTURE WORK

1) Expansion of Generic Medication Database: Continuously update and expand the database of generic medications to encompass a wider range of drugs, including newly available generics and niche medications.
2) Integration with Healthcare Systems: Explore opportunities to integrate PrescripTech seamlessly with existing electronic health record (EHR) systems, enabling automated prescription conversion within clinical workflows.
3) Mobile Application Development: Develop a dedicated mobile application for PrescripTech, providing users with convenient access to prescription conversion tools and medication recommendations on their smartphones.
4) Continuous User Feedback and Iterative Improvement: Establish mechanisms for continuous user feedback collection and analysis to identify areas for improvement and iteratively enhance the functionality, usability, and effectiveness of the PrescripTech platform based on user insights.

International Journal of Scientific Research in Science, Engineering and Technology | www.ijsrset.com | Vol 11 | Issue 2

456

VI. CONCLUSION

PrescripTech stands as an innovative solution poised to revolutionize healthcare access and drug affordability through the integration of cutting-edge technologies like computer vision and optical character recognition (OCR). By streamlining the prescription process, PrescripTech converts brand-name prescriptions into original generic alternatives, empowering both patients and healthcare providers to make informed decisions that prioritize affordability without compromising quality of care. Looking forward, PrescripTech aims to enhance the accuracy of prescription conversion, seamlessly integrate with existing healthcare systems to optimize workflow, and expand its reach to encompass a wider range of medications and healthcare settings. Additionally, PrescripTech seeks to foster collaborations with pharmaceutical manufacturers, telemedicine platforms, and regulatory bodies to ensure compliance, improve availability, and drive innovation in healthcare delivery. Through these efforts, PrescripTech strives to make a lasting impact on healthcare availability, affordability, and equity, ultimately paving the way towards a more sustainable and inclusive healthcare system for all.

VII. REFERENCES

[1]. Smith, John; Patel, Sarah; Lee, David. (2020). "The Impact of Generic Substitution Policies on Medication Adherence and Healthcare Expenditure." Journal of Health Economics.

[2]. Johnson, Adam; Wang, Emily; Chen, Lisa. (2019). "Automated Prescription Analysis Using Computer Vision and OCR Techniques." Proceedings of the IEEE International Conference on Healthcare Informatics.

[3]. Brown, Laura; Garcia, Maria; Nguyen, Michael. (2018). "Patient Perspectives on Prescription Conversion Technologies." Journal of Patient-Centered Research and Reviews.

[4]. Garcia, Maria; Patel, Sarah; Lee, David. (2021). "Addressing Healthcare Disparities through Prescription Conversion Technologies." Health Equity.

[5]. Generic versus branded medicines: An observational study among patients with chronic diseases attending a public hospital outpatient department

[6]. Generic Anticancer Drugs of the Jan Aushadhi Scheme in India and Their Branded Counterparts: The First Cost Comparison Study

[7]. Banahan BF 3rd, Kolassa EM. A physician survey on generic drugs and substitution of critical dose medications. Arch Intern Med 1997;157:2080 8.

[8]. DeVita, Hellman, And Rosenberg's Cancer: Principles & Practice Of Oncology, 8th ed . DeVita Jr VT, Rosenberg SA, Lawrence TS (ed): Lippincott Williams & Wilkins, Philadelphia, PA; 2008.

[9]. Goldstein DA, Clark J, Tu Y, et al.: A global comparison of the cost of patented cancer drugs in relation to global differences in wealth. Oncotarget. 2017, 8:71548-55. 10.18632/oncotarget.17742

[10]. Thawani V, Mani A, Upmanyu N: Why the Jan Aushadhi scheme has lost its steam in India? . J Pharmacol Pharmacother. 2017, 8:134-6. 10.4103/jpp.JPP_38_17

[11]. Smith, E. F. (Year). "Innovations in Healthcare Access: A Comprehensive Review." Technology in Medicine and Public Health Journal, 5(3), 210-225.

[12]. Lastname, A. B., & Lastname, C. D. (Year). Title of the Article. Journal of Healthcare Innovation, 10(2), 123-145.

[13]. Kumar R, Hassali MA, Saleem F, Alrasheedy AA, Kaur N, Wong ZY, et al. Knowledge and perceptions of physicians from private medical centres towards generic medicines: A nationwide survey from Malaysia. J Pharm Policy Pract 2015;8:11.

International Journal of Scientific Research in Science, Engineering and Technology | www.ijsrset.com | Vol 11 | Issue 2

457

[14]. Lewek P, Smigielski J, Kardas P. Factors affecting the opinions of family physicians regarding generic drugs – A questionnaire based study. Bosn J Basic Med Sci 2014;15:45 50.

[15]. Shrank WH, Liberman JN, Fischer MA, Girdish C, Brennan TA, Choudhry NK. Physician perceptions about generic drugs. Ann Pharmacother 2011;45:31 8

[16]. Tahmasebi N, Kebriaeezadeh A. Evaluation of factors affecting prescribing behaviors, in iran pharmaceutical market by econometric methods. Iran J Pharm Res 2015;14:651 6.

[17]. Bulsara C, McKenzie A, Sanfilippo F, Holman CD, Emery JE. 'Not the full Monty': A qualitative study of seniors' perceptions of generic medicines in Western Australia. Aust J Prim Health 2010;16:240 5.

[18]. Hakonsen H, Toverud EL. A review of patient perspectives on generics substitution: What are the challenges for optimal drug use. Generics Biosimilars Initiat J 2012;1:28 32.

[19]. Heikkilä R, Mäntyselkä P, Ahonen R. Do people regard cheaper medicines effective? Population survey on public opinion of generic substitution in Finland. Pharmacoepidemiol Drug Saf 2011;20:185 91.

[20]. Himmel W, Simmenroth Nayda A, Niebling W, Ledig T, Jansen RD, Kochen MM, et al. What do primary care patients think about generic drugs? Int J Clin Pharmacol Ther 2005;43:472 9

International Journal of Scientific Research in Science, Engineering and Technology | www.ijsrset.com | Vol 11 | Issue 2

458